PATENT
Atty. Docket No.: GRQ-00100

## REMARKS

Within the Office Action, Claims 1-4, 14, 143 and 144 are rejected under 35 U.S.C 102(b) as being anticipated by U.S. Patent 2,746,813 to Massa (hereinafter "Massa"). In addition, Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as unpatentable over Massa in view of U.S. Patent 4824,262 to Kamigaito et al. The Applicants have amended claims 1,2, and 143. In addition, the Applicants have withdrawn claim 144 without prejudice and added new independent claims 145-148. Therefore, Claims 1-4, 14, 16, 17, 143, 145-148 are currently pending.

**Telephone Interview**

The Applicants wish to thank Examiner Nguyen for granting and participating in the telephone interview on April 3, 2003. The Applicants sincerely appreciate Examiner Nguyen's time and courtesy as well as her suggestions regarding the claims of the present application. Pursuant to the telephone interview, Claims 1 and 143 were amended to include the limitations agreed to by Examiner Nguyen. In addition, new Independent Claims 145-148 are added which include the limitations agreed to by the Examiner. These particular claims are discussed below. In addition, the Examiner stated during the interview on April 3, 2003 that she would review the new and amended claims in light of the additional prior art submitted in the information disclosure statement filed by Applicants on March 4, 2003 as well as review the specification of the present application to check for adequate support in the new and amended claims. The Applicants submit that the new and amended claims are fully supported by the present specification and are distinguishable over the prior art.

**Restriction Requirement**

In the first Office Action dated March 6, 2002, it is stated that Claims 1-53 were subject to a restriction requirement under 35 U.S.C. 121, which are drawn to a method of controlling. It is also stated in the March 6, 2002 Office Action that Claim 1 is generic. Further, it is stated that upon allowance of a generic claim, the Applicants are entitled to consideration of claims to additional species in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 C.F.R. 1.141. Pursuant to the telephone interview, generic Independent Claim 1 has been amended and is now in a condition for allowance. Amended

Claim 2 and claims 3-27 are dependent on an allowable Claim 1 and are therefore entitled to consideration. In addition, since Claims 2-27 are distinguishable over the prior art and are dependent on an allowable base claim, Claims 2-27 are in condition for allowance.

**Rejections Under 35 U.S.C. 102(b)**

Within the Office Action, it is stated that Massa teaches a method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element. In addition, it is stated within the Office Action that Massa teaches that the first and second surfaces are configured to be in slidable contact with one another along an interface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween. It is also stated within the Office Action that Massa teaches, in column 1, lines 66-69, inducing a symmetrical and repetitive motion in the first surface parallel to the interface, thereby altering the effective coefficient of friction. The Applicants respectfully disagree.

The present invention is directed to a method of controlling an effective coefficient of friction along an interface between the surfaces of two mating elements. Specifically, the present invention alters the effective coefficient of friction by inducing a repetitive motion in a first element against a second element, whereby the motion of the first element at the anti-nodal regions against the surface of the second element changes the effective coefficient of friction in between the two surfaces. The first element horizontally expands and contracts while it is energized and undergoes the repetitive motion. During expansion, the ends of the first element move away from the center, whereby the change in length causes the thickness of the center of the first element to decrease in size. In contrast, during contraction, the ends move toward the center of the element, whereby the change in length causes the thickness of the center of the first element to increase in size or "bulge". In other words, the change in horizontal length in the first element while energized causes the center of the first element to undergo a vertical dimension change. The center of the first element is a nodal region. (See for example Figure 8 of the present application.)

The present invention alters the effective coefficient of friction between the first and second element by placing the second element in contact with the anti-nodal regions of the first element. The anti-nodal regions are the regions of the first element which do not undergo vertical displacement. In addition, since the first element does not undergo vertical displacement, the force holding the first element to the second element does not change. Further, it is preferred that a set of contact pads having an appropriate height are placed at the anti-nodal

regions, whereby the second surface does not experience any of the vertical displacement in the first element. Therefore, the second element only experiences a repetitive motion which is parallel to the second surface, whereby the repetitive motion causes the change in the effective coefficient of friction.

Massa teaches a body employing high frequency compressional waves in a bearing 1 which reduces the amount of static friction between the surface of the bearing 1 and a moving body 2 placed on top of the bearing 1. Since compressional waves are transmitted through the bearing 1, the bearing 1 undergoes horizontal as well as vertical expansion and retraction changes along the body of the bearing 1. However, in marked contrast to the present invention, the entire bottom surface of the moving body 2 is in contact with the top surface of the bearing 1. Therefore, the moving body 2 also experiences displacement of the bearing 1 in the vertical direction as well as the horizontal direction due to expansion and contraction of the bearing 1. This vertical displacement in the bearing 1 thus creates a change in the force holding the body 2 to the bearing 1 and, in some cases, creates an air cushion, because the vertical displacements attempt to push or "bump" the bottom surface of the moving body 2 off the top surface of the bearing 1. Since an air cushion or at least a change in force holding the body 2 to the bearing 1 can be created due to the high frequency of "bumps," the actual static friction between the two objects decreases which is quite different from the present invention.

Amended claim 1 is directed to a method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of: configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween; and inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction between the first and second surfaces, wherein the force is substantially unaltered by the repetitive motion. As stated above, Massa does not teach that the holding force is unaltered by the repetitive motion. As stated above, the vertical displacement in the bearing 1 in Massa creates a change in the force holding the body 2 to the bearing 1 and, in some cases, creates an air cushion, because the vertical displacements attempt to push or "bump" the bottom surface of the moving body 2 off the top surface of the bearing 1. The holding force applied to the second element in the present invention does not undergo a change, because the first element does not push or "bump" the second element to cause the first element to undergo a vertical displacement. For at least these reasons, amended Claim 1 is allowable over Massa. Therefore, amended Claim 1 is in a condition for allowance.

Amended Claim 143 is directed to a method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of: configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface, wherein the interface is located only along an anti-nodal region of the first element, the first and second surfaces under a force sufficient to maintain contact at the interface and having a static friction therebetween; and inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction. In contrast to the present invention, Massa teaches that the body is in full contact with the surface of the bearing. Thus, the body in Massa is in contact with the nodal as well as the anti-nodal regions of the bearing. As in amended Claims 143, the interface is only along the anti-nodal region, which experiences substantially no vertical displacement. Thus, Massa does not teach that the first surface and the second surface are in slidable contact with one another only at the anti-nodal region. For at least these reasons, amended Claim 143 is allowable over Massa. Therefore, amended Claim 143 is in a condition for allowance.

Pursuant to the telephone interview, additional independent claims were agreed to which distinguishes over the references cited. The Applicants have submitted new independent claims 145-148 which incorporate the limitations agreed to pursuant to the telephone interview. The Applicants submit that Claims 145-148 do not contain new matter and are allowable over the references cited, individually and in combination.

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**Rejection Under 35 U.S.C. 103(a)**

Claims 16 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Massa in view of Kamigaito et al. However Claims 16 and 17 are dependent on an allowable independent Claim 1. Accordingly, Claims 16 and 17 are also in a condition for allowance.

Should the Examiner have any questions or comments, she is encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
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Marked-Up Version of Claims Showing Changes Made

*Please withdraw claim 144 without prejudice and amend the following claims*

1. (Amended) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:
   a. configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween; and
   b. inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction between the first and second surfaces, wherein the force is substantially unaltered by the repetitive motion.

2. (Amended) [A] The method of controlling according to claim 1 wherein the repetitive motion is [an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:
   a. configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween; and
   b. configuring a set of contact pads on the first element, the second surface in contact with the contact pads at the interface; and
   c. inducing a] symmetrical [motion in the first surface parallel to the interface thereby altering the effective coefficient of friction].

143. (Amended) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:
   a. configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface, wherein the interface is located only along an anti-nodal region of the first element, the first and second surfaces under a force sufficient to maintain contact at the interface and having a static friction therebetween; and
   b. inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction.

*Please add the following new claims:*

145. (New) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:

a. configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween;

b. configuring a set of contact pads on the first element, the second surface in contact with the contact pads at the interface; and

c. inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction, wherein the first surface remains in contact with the contact pads in the set at the interface.

146. (New) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:

a. configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface at a plane and under a force sufficient to maintain contact and having a static friction therebetween; and

b. inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction between the first and second surfaces, wherein the interface remains substantially at the plane unaltered by the repetitive motion.

147. (New) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:

a. configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface at a plane, wherein the interface is located along an anti-nodal region of the first element, the first and second surfaces under a force sufficient to maintain contact at the interface and having a static friction therebetween; and

b. inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction, wherein the interface between the first and second surface remains substantially at the plane unaltered by the repetitive motion.

148. (New) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:

a. configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface, wherein the interface is located along an anti-nodal region of the first element, the first and second surfaces under a force sufficient to maintain contact at the interface and having a static friction therebetween; and

b. inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction, wherein the force is substantially unaltered by the repetitive motion.